

DEVELOPMENT OF A SMALL-SCALE HAY BALER

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Insufficient feeds due to seasonal production and low quality are major reasons for the low productivity of dairy animals. Crop residues, which is preserved as hay bales, is an effective measure to overcome this situation. Although heavy machinery is used to prepare bales at the field in developed countries, the unavailability of an affordable mechanical solution is a constraint to produce hay bales for small-scale farmers in Sri Lanka. Therefore, this study aimed to introduce efficient and affordable hay baling machine for a small-scale level. The main components of the machine are bale mould, ladder, handle, and wooden piston. The most salient feature of the developed machine was compacting dried residues with the own weight of the operator. The height, width, and length of the machine were 170 cm, 40 cm, and 120 cm, respectively. The total material cost of the machine was approximately 9,500 LKR. The performance was evaluated in terms of baling capacity, efficiency, post-compression expansion, and user feedback. The minimum time required for the preparation of hay bales by a person having a bodyweight of 60 kg was 7 minutes and 35 seconds. The theoretical and actual capacities and efficiency were 8.76 bales h⁻¹, 5.06 bales h⁻¹, and 57.78%, respectively. The average weight of a bale was 2.42 kg, and the length, width, and height of a bale was 60 cm, 30 cm, and 30 cm, respectively. Results revealed that the machine is affordable and suitable to prepare the bales with a satisfactory capacity and efficiency for small-scale production.

Keywords: Baling capacity, Hay bale, Hay baling machine, Post compression expansion